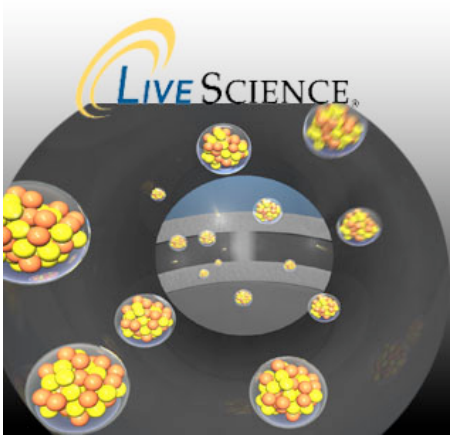
LAWRENCE LIVERMORE
REPORT

A weekly collection of scientific and technological achievements from Lawrence Livermore National Laboratory: March 15-March 22, 2010

A superheavy trip



Artist's conception of calcium ions traveling down an accelerator toward the rotating californium target during the creation of element 118.

There is an island known out there as the "Island of Stability," where a superheavy element lives that is stable for more than a millisecond.

Scientists have been on this journey for quite some time and get closer every time they create larger and larger atoms with more protons and neutrons than ever before.

By building these super-heavy elements, scientists are not just creating new kinds of matter -- they are probing the subatomic world and learning about the mysterious forces that hold atoms together.

"Of course discovering something new is always very interesting, but the main motivation is, we don't understand how nuclei work out in these extreme limits," said Dawn Shaughnessy, a chemist at Lawrence Livermore National Laboratory.

To read more, go to http://current.com/1un7c4c

Time's rising tide may swamp Delta

The Sacramento-San Joaquin Delta.

While marshes in the Sacramento-San Joaquin Delta area are currently keeping pace with rising sea levels, they may not be sustainable under future sea-level increases.

The current rate of vertical soil formation or accretion may not be enough to keep rising marshes from being flooded in the future. These results are part of a new study in the the journal, *Estuaries and Coast*, by Lab scientist Tom Brown in collaboration with Judith Drexler and Christian de Fontaine of the U.S. Geological Survey.

Using the radiocarbon measurement capabilities of the Lab's Center for Accelerator Mass Spectrometry, Brown analyzed macrofossils in peat soil samples to determine how quickly peat has formed over the past 6,700 years. At four of the marsh sites, peat has accreted from .03 to .49 centimeters per year.

Marshes form where hydrologic, geomorphic and ecological factors are conducive to the initial and continued buildup of mineral sediment and organic matter. In tidal freshwater marshes, this accrual of material results in the formation of organic, peat soils.

To read more, go to http://www.physorg.com/news187950445.html

A whole lotta wind

A box is a near perfect fit to pack something up. If you want to drag it 700 miles down a highway at 70 miles per hour, though, you could do a lot better.

Finally, people are trying. The heavy truck maker Navistar and the Laboratory put a 53-foot big rig in the world's largest wind tunnel, at NASA's Ames Research Center in hopes of making those big boxes more fuel efficient.

The rig sat on a supersensitive balance platform while six fans, each 40 feet in diameter, mimicked the wind forces of a truck going down a turnpike at speeds from 20 to 80 miles per hour. They threw in crosswinds, too, and measured the effects on the truck.

The goal is to improve the fuel economy of the nation's heavy trucks. They get an average of just six miles per gallon. A big part of that is simply that trucks haul heavy stuff. But heavy trucks aren't exactly sleek. They slice through the air only half as well as a typical sedan, as measured by their coefficients of drag.

The results of the testimony will be published later this year.

To read more, go to http://www.forbes.com/2010/02/16/supercomputers-nasa-science-technology-ecotech-smarttruck.html

Cadets shine during ROTC

About 80 Reserve Officer Training Corps (ROTC) cadets and midshipmen from 16 California universities visited the Laboratory recently to learn more about LLNL and internship opportunities here.

The students, from three of the armed services (the Army, Navy, and Air Force), as well as the Merchant Marine, received briefings and toured the National Ignition Facility and the High Explosives Applications Facility. They also heard a Laboratory overview and a panel discussion on "Future Careers in the Military and the Role Science and Engineering Will Play."

Brig. Gen. Garrett Harencak, the National Nuclear Security Administration's principal assistant deputy administrator for Military Application, was one of the featured speakers on the "future careers" panel discussion. He also delivered an address on leadership.

ROTC Day is a component of LLNL's military academic collaborations. The ROTC intern program provides hands-on internship opportunities to undergraduate cadets and midshipmen. Additionally, research assignments may be available for cadets and midshipmen who finish their course requirements early, prior to starting their military obligations.

Latest *Newsline* available

NEWSLINE

Newsline provides the latest Lab research and operations news. See the most recent issue at https://newsline.llnl.gov

Photo of the week:

Blowing in the wind: Icelandic poppies tower over marigolds in a planter in front of the Lab's Terascale Simulation Facility.

LLNL applies and advances science and technology to help ensure national security and global stability. Through multi-disciplinary research and development, with particular expertise in high-energy-density physics, laser science, high-performance computing and science/engineering at the nanometer/subpicosecond scale, LLNL innovations improve security, meet energy and environmental needs and strengthen U.S. economic competitiveness. The Laboratory also partners with other research institutions, universities and industry to bring the full weight of the nation's science and technology community to bear on solving problems of national importance.

To send input to the Livermore Lab Report, send e-mail mailto:labreport@llnl.gov.

The *Livermore Lab Report* archive is available at:
https://publicaffairs.llnl.gov/news/lab_report/2010index.html